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DESCRIPTION

OF THE

PATENT

Metallic Lining and Damper

FOR THE

CHIMNEYS

OF

DWELLING AND OTHER HOUSES

AND BUILDINGS,

INVENTED BY

MR. SETH SMITH,

OF

WILTON CRESCENT, BELGRAVE SQUARE.

ILLUSTRATED BY ENGRAVINGS.

LONDON:

LONGMAN, REES, ORME, BROWN, AND GREEN;

AND

CARPENTER & SON, OLD BOND STREET.

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Specimens of the Patent Metallic Lining and Damper may be seen, and the prices of the several sizes and forms, and particular directions obtained, at the Large Rooms, Halkin Street West, Belgrave Square.—All communications to be addressed to Mr. SMITH'S OFFICE, WILTON-CRESCENT.

WILTON-CRESCENT
HALKIN STREET WEST
BELGRAVE SQUARE

C. Richards, Printer, 100, St. Martin's-lane, Charing-cross.

PATENT METALLIC LINING AND DAMPER FOR CHIMNEYS.

It has by some been considered doubtful whether the Greeks and Romans, during the period of their greatest eminence for architectural productions, had any chimneys in their dwelling houses ; but as Homer, Aristophanes, Virgil, and Appian are supposed to mention or make allusion to them, it has been inferred by other writers that they were not wholly unknown to those ancient builders.

The oldest certain account of the use of chimneys is stated to be 1347, and it is conjectured they were invented in Italy. . . Smoke Jacks, which must have been invented subsequently to chimneys, are supposed to be of German origin, and from a painting which is known to be older than 1350, it is supposed they were in use before that period.

In the houses discovered at Herculaneum and Pompeii, there are it is said, no chimneys, but they appear all to have been warmed by means of flues and a subterraneous

furnace. Stoves and flues, it is thought probable, were introduced about the time of Nero. Seneca relates that in his time there were invented certain tubes, which were placed in the walls, by which the heat of the fire was made to circulate and warm equally the upper and lower apartments. These observations have been quoted as proofs that chimneys were unknown at those periods, but have they not a contrary tendency? It appears more probable that a chimney should furnish the idea for such stoves, than that the use of stoves should be known before chimneys.

In the Old Testament there are several allusions to furnaces for the smelting of iron and other metals, which would appear to leave no doubt of the use of chimneys being known at a very early period, especially to the Egyptians. (*See Gen. 15. xvii. Deut. 4. xx. & Ezekiel 22. xx.*) In Nehemiah the towers of the furnaces are spoken of. In the 1st Book of Samuel, 30. xxx. a city is called the smoking furnace, (*Chor Ashan*) probably from the number of chimneys erected in it. The Arabic root renders the word *round*; they were, no doubt, built in the form of a round tower of lofty height, like some of the chimneys of manufactories at the present day.

Although the antiquity of chimneys should be satisfactorily proved, all accounts, if any there be, of their form or material, would probably, on close examination, turn out mere conjecture, and consequently it would re-

main uncertain to what degree of perfection the ancients attained in this part of domestic architecture. The research would be much less difficult, and probably the time might be correctly ascertained, when the present ordinary prismatic chimney began to be used, instead of the broad pyramidal form, which is still found in many of the old houses in this country. An inverted pyramid has by some been recommended; but although such a shape may have cured a smoky chimney, it is in general altogether inapplicable, and in any case would be attended with greater inconvenience than advantage. Since the introduction of the prismatic form (in consequence of the great number of smoky chimneys which are every where to be found) much has been said in favour of, and many attempts have been made to introduce German, and other stoves, into English dwellings. But the open grate, which is emphatically called the "English Fire-side," is still undoubtedly the favourite method with the bulk of the population of this country; and the late Mr. Tredgold has pointed out that it is more agreeable to nature, and better for health, than any other by which our dwelling houses can be heated.

If the antiquity of chimneys be satisfactorily proved, possibly the following train of reasoning may show the probability that the ancients were not altogether unacquainted with the use of the damper, and that they knew that damp air or vapour, which is specifically lighter than

dry air, is the vehicle or medium by which smoke ascends.* The bottle in the smoke referred to in Ps. cxix. 83. might have been used for this purpose, and probably gave the idea of hanging a blown bladder in the chimney, which has frequently been used, either to increase the draft, or to prevent the return of the smoke. The bladder has been applied at different heights in the chimney, even at the top of the flue ; but whether water has ever been used in the bladder or the leathern bottle, or where the latter was suspended, is perhaps uncertain. In the *Builder's Dictionary* (*Edit.* 1726.) is the following account of a method used to increase the rate of the ascent of smoke in a chimney.

“ Philippe de l'Orme proposes to provide a hollow brass ball of a reasonable capacity, with a little hole on one side for the reception of water. I think it were better made with a short nose, to screw off when it is filled with water ; and then the hole at the end of this nose needs not to be bigger than at the small end of a tobacco pipe. This ball being filled with water, it is to be placed with the hole upwards, upon an iron-wire, that shall traverse

* It is indeed said that steam, admitted into a flue, destroys the smoke. The ancients, according to Pliny, anointed their wood intended for fuel with the lees of oil, in order to mitigate the nuisance which they experienced from smoke. If charcoal were saturated with oil, it would perhaps as fuel for locomotive steam engines, be found to be an improvement.

the chimney a little above the mantel-tree, at the ordinary height of the greatest heat or flames ; and when the water is hot it will be rarified, and break out of the hole in a windy vapour, which will force up the smoke, that might linger in the tunnel by the way, and oftentimes revert. It were better to have two of these balls, one of them may supply the place of the other when it is exhausted ; or for a need, blow the fire in the mean time.”*

Here we have a description of a real damper, and as this, by the space it occupied, contracted the chimney, hence probably the term damper has been since applied to other methods of contraction. Certainly the term damper conveys no idea of the use of the contrivances known by that name. The facts contained in the above observations did not, however, suggest the idea of the patent damper, for they were not known to the inventor until after the patent was obtained, and it will be observed that the means of regulating the draft and securely closing the chimney are not here adverted to.

The imperfections of the present chimneys have been long known, and so much importance has been attached

* If the bottle in the smoke was not suspended in a chimney, as the ball and the bladder have been used, perhaps it might have been suspended over a stove. If so, it might have led to the idea of placing an open vessel of water on the head of a stove, which it is said, will prevent headaches and other ills, that, without this precaution such methods of heating apartments are liable to produce.

to their perfect construction in this metropolis, that we can only account for the fact that a nearer approximation to perfection has not long ago been attained, by the conviction, that man hath no control over the time when any particular improvement is to be made. Why one generation is favoured with greater inventive powers than another, or why the most simple and most obvious conclusions are not always drawn in the first instances, can only be known to the Almighty Governor of the universe.

To make the ordinary chimneys as perfect as possible, in an Act of Parliament called the Building Act, for the more effectually preventing mischief by fire, within the Cities of London and Westminster, &c. &c. particular directions are given for their construction; but notwithstanding these injunctions, which have been in force for sixty years under the superintendence of district surveyors, and even where the most vigilant attention on the part of architects, master-builders, and foremen, has been added, there is no certainty that every part of every chimney is perfectly constructed, or that timber is not frequently placed too near them.

From the forgetfulness or want of thought in workmen, the lining of chimneys, commonly called pargeting, is perhaps seldom completely performed, and not unfrequently holes are left in flues for the scaffolding. When this is the case, the lining cannot be made good, and the holes are seldom if ever perfectly filled, perhaps only stopped

by dry bricks. Besides this uncertainty of having ordinary chimneys properly built in the first instance, they may be rendered imperfect by settlements producing fractures, and by various artificers cutting into the walls, and driving into them, plugs, spikes, wall-hooks, &c. for fixing joiners', plumbers', and other works. The pargeting is also much injured by every operation of sweeping the chimney, and will be still more so with the use of machinery. In the event of a chimney having been on fire, the pargeting will be entirely destroyed in a short time. Any of these circumstances, which occur more or less in every building, and render the chimneys imperfect, are the cause of much annoyance from smoke; and when the imperfections are near wood-bricks, bond-timbers, battening, laths, skirting of rooms, or any of the various thin wooden linings, or the shelves of cupboards, or the timbers and boards of the floors, they greatly increase the risk from fire, and are, no doubt, frequently the cause of houses being burnt, and occasion thereby so much loss of property, so much anxiety of mind, so many painful accidents, and so many dreadful deaths.*

An extensive practical experience in building for many years, and with some of the consequences resulting from

* It has been estimated that in London there is an annual loss of five lives, and of property to the amount of £100,000 by fire, and that the average number of fires in a year, is thirty-five.

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the defects in ordinary chimneys, which are here perhaps imperfectly enumerated, continually before him, the Patentee saw the necessity for, and was thus led to the invention of, his metallic fire-proof lining, for the chimneys of dwelling, and other houses and buildings.

The accompanying Engravings, with the annexed extracts from the specification, will fully explain the nature of his invention, and the method of its application.

The simplicity and great importance of this invention will be at once perceived by every person who has been the occupier of a house, but more particularly by architects, surveyors, and builders. The Patentee, therefore, indulges a sanguine expectation that it will receive from them and the public in general, its fair testimony of approbation. Besides forming a complete fire-proof lining to chimneys, the metallic lining has the additional advantage of suppressing the odious, painful, and sometimes fatal, practice of climbing boys, and on this account will no doubt receive the cordial approbation of the Society formed for that purpose, and from all friends of humanity. The form and size of the ordinary chimney, has long been retained for no other purpose than to admit climbing boys, although both have been condemned by scientific men. Indeed, how frequently do we find that a chimney requires contraction; and the late Mr. Tredgold, who has perhaps treated this subject with more practical and scientific knowledge combined, than any other writer, says,

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“that most of our smoky rooms are in consequence of the flues being too large,” and the same intelligent author who well knew their defects, recommends the circular form for their transverse section, which indeed has long been considered the best by other writers, architects, and builders, who have thought upon this subject.

The metallic tubular linings may be made of any form, and the sizes may vary with the sizes of the fires and the lengths of the flues. The circular form is however at present for most purposes preferred.

The following sizes are now in use :—viz. 5, 6, 7, 8, 9 and 10 inches inside diameter respectively.

The Patentee considers that stove manufacturers may easily adapt their register stoves to his metallic tubes, so as to make a metal chimney from the fire upwards, while such as prefer more open grates, and object to much metal about the fire-place, may without difficulty make their contractions to accord therewith.

Besides the application of the metallic tubes to chimneys in new houses, they may also be introduced into, and form perfect linings to the flues of old or imperfect chimneys in any other building.* This may be done by making openings into the flues, on each floor, and putting in, up, or down, the necessary lengths and forms of

* The employment of climbing boys to sweep chimneys is deemed *odious* :—How then must it be designated, when for hours together, they are shut up in a chimney, repairing, or repargeting old and imperfect flues?

tubing. In general the openings for putting in the tubes may be made within the several fire-places. The expense of doing this, it must be manifest, will be trifling compared with the rebuilding of a party wall, and the attendant work which such rebuilding would occasion.

These metallic chimney linings will also be found particularly useful in those parts of the country where stone is used for building, especially where it is flinty, or of a cold and damp nature. In such houses smoky rooms are more frequent than in brick buildings. And it may also be used to very great advantage in the cobbwalls, (of which houses are frequently built) in Devonshire, &c.*

In order that architects and builders may be enabled to calculate the exact quantity of the several shapes of the metallic lining required for any building, moulds have been made of the various forms to different scales, and models of particular parts, which it is presumed will materially assist in determining the best method of turning the direction of a flue under any circumstances.

No particular termination at the top of the chimney is recommended, but caps and contracting pieces of various descriptions will be prepared to fit the tubing ; indeed

* The duty on brick and tiles, which adds comparatively but little to the revenues of the country, is considered the means of entailing much of the discomfort and misery arising from damp houses, especially to the poor ; while the removal of this duty (for bricks are better than any other material for the inside of dwelling houses) would produce a great increase of employment to the labouring population.

this is an interesting field for design, in which it is generally allowed there is abundant room for improvement.

Having, however, obtained in the metallic tubes a perfect fire-proof lining for chimneys, which cannot be injured by the sweeping machine, and which is also a strong bond to the brick or other material in which it may be imbedded, it will, no doubt, lead to many other improvements in buildings, which it will be the object of the Patentee to effect. Indeed, it has long been an object with him, by using stone staircases, to render his buildings more secure from fire. On the whole, it is presumed that the metallic chimney lining will be considered an important improvement in Domestic Architecture, whether regarded in reference to security from fire, the suppression of climbing boys, the prevention of houses being entered by descending the chimney, the annoyance from smoke, or the strength of the building; in short, it will, without doubt, be found to add much to the comfort, cleanliness, and safety of our dwellings, and the cheerfulness of an English fire-side: it will also have a tendency to increase the consumption of iron, one of the staple commodities of the country, and thus produce an increase of labour, which, at this time, is so much required.

In many places where the metallic lining may be used, there may be a considerable reduction in the brick work in the chimney breasts: in such cases the cost of the tubes will make but an inconsiderable addition to the cost of a first-rate house; and of course, to all houses it

will be found to be generally proportionable. If, however, the cost of the metallic lining were much greater than it will be in any case, the advantages which will result from it, would be found an ample equivalent ; and perhaps it seldom happens but that there is some expense, and frequently as much, in endeavouring in vain to cure smoky chimneys, while many of the bad effects and dangers arising from the imperfections of the present method of pargeting remain and must be endured. These observations, therefore, clearly make it appear that a small additional cost in the building of a house, by making all the chimneys perfect, is not an object worthy of the least consideration.

Mr. White, the eminent Architect and District Surveyor for St. Mary-le-bone, who has been particularly consulted upon the details of the Bill now before Parliament for amending the Building Act, having alluded to the extreme thinness of party walls where the fire places are back to back, which circumstance frequently occasions the sound in one house to be heard distinctly and unpleasantly in the other, it was pointed out to him that it would not be the case where the metallic lining is used, for without any increase in the projection of the chimney breast, the party wall will in the part complained of, be double the thickness. And as the chimneys in the one house (except those in the attic) it is recommended, should be kept at a distance from those in the other, the sound would, by that means be still more effectually prevented.

DESCRIPTION OF THE ENGRAVINGS.

PLATE I.—Fig. 1. is an elevation in section of a stack of chimneys, in a dwelling house, lined with metal tubes, and thus showing my first improvement.

PLATE II.—Figs. 2, 3, 4, 5 and 6, are drawings to a larger scale, showing the several pieces of tubing by which I obtain the various directions and turns in the chimneys, necessary for such a stack as aforesaid.

Fig. 7 is a plan of the general tubing. The tubes here represented are supposed to be made of cast iron, and fitted together by means of a flange lip or rim as shown in the drawing.

PLATE III.—Fig. 8 is a front view in section of my damper or draft regulator in its position in the chimney and fire-place. A, B, are two cones, united by flanges at their bases; the upper one being furnished with a lip or gutter, C C, for the bottom of the chimney lining to shut into. D is a circular ring or plate of iron, on which I raise the first piece of metal tube or lining, and which I therefore call the starting plate. E is a bar of iron, furnished with two pulleys, F F, over which pass the two chains G G; thus supporting the double cone by one end, and by the other the balance weight H. It will be seen by this arrangement, that when the balance weight H is raised, the double cone or damper will descend, thus opening a greater or less passage for the air up the chimney; while, on the contrary, if kept in the position shown in this figure, and fastened there by the nut K, no air can pass up or down the chimney. When the passage for the draft is opened to its greatest extent, the damper will assume the position shown by the dotted lines in this figure.

Fig. 9 is a side view in section of my damper or draft regulator in its position in the chimney and fire-place. In this figure it is shown open, while the dotted lines show its closed position.

Fig. 10 is a plan of the starting plate D, and figure 11 is its section.

Fig. 12 is the plan of the cross or supporting bar E, and figure 13 is its section.

It will be observed, that when the damper is used it is necessary to cast a recess in the first piece of tubing or lining above the starting plate, to receive the ends of the cross bar, as at J J, figure 14. Of this first piece of tubing figure 15 is the plan.

Fig. 16 is the plan, and figure 17 the section of the double cone damper.

Fig. 18 is a section of the nut K.

Fig. 19 is a separate drawing of the balance weight H, and the rod by which it is connected with the chains G G, shown within the nut K.

The several pieces, as they are drawn separately, are each marked with a letter which refers to the piece, as it is united with others in figures 1, 8, and 9.

Figure 20 is a plan of a fire-place or opening for a grate or stove prepared to receive the damper.

The stack of chimneys represented in Plate I. is given with the view of showing several pieces of pipes rather than to recommend the directions in which the chimneys proceed from the several fire-places. It will be generally desirable to make the distances between the centres of the several flues equal when they reach the top of the building, and as it is considered that it will check the ascent of the smoke, if the direction of a chimney cross the same vertical line more than once, it will probably be generally best to make all the flues to turn to the same hand, from a little above the several fire-places. Separate flues should also be introduced for any oven, hot-plate, or boiler, that may be required in the kitchen, scullery, &c.

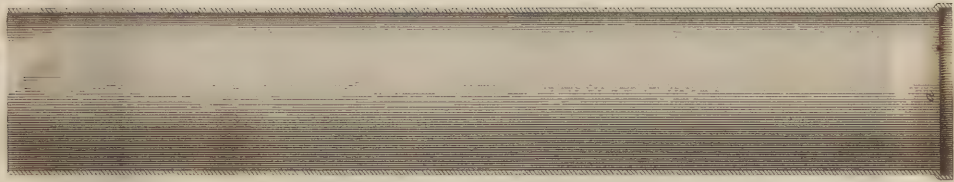


Fig. 2.

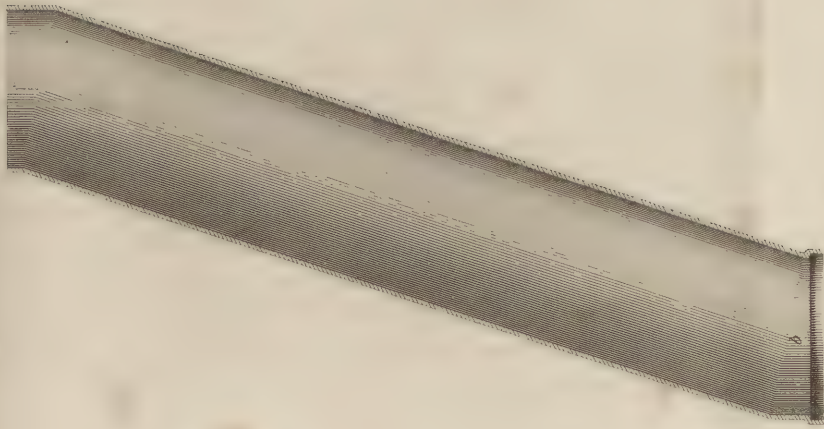


Fig. 3.

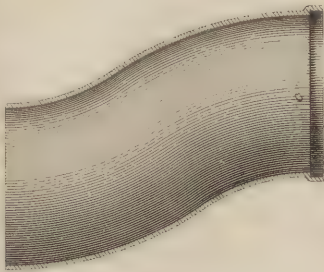


Fig. 4.

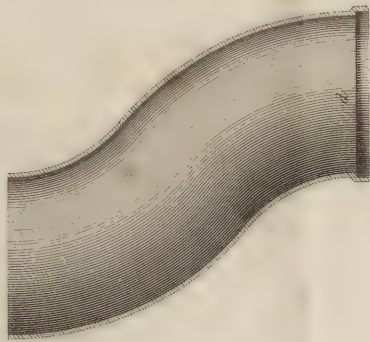


Fig. 5.

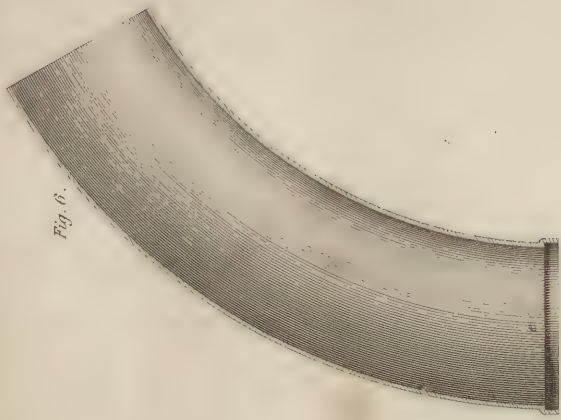


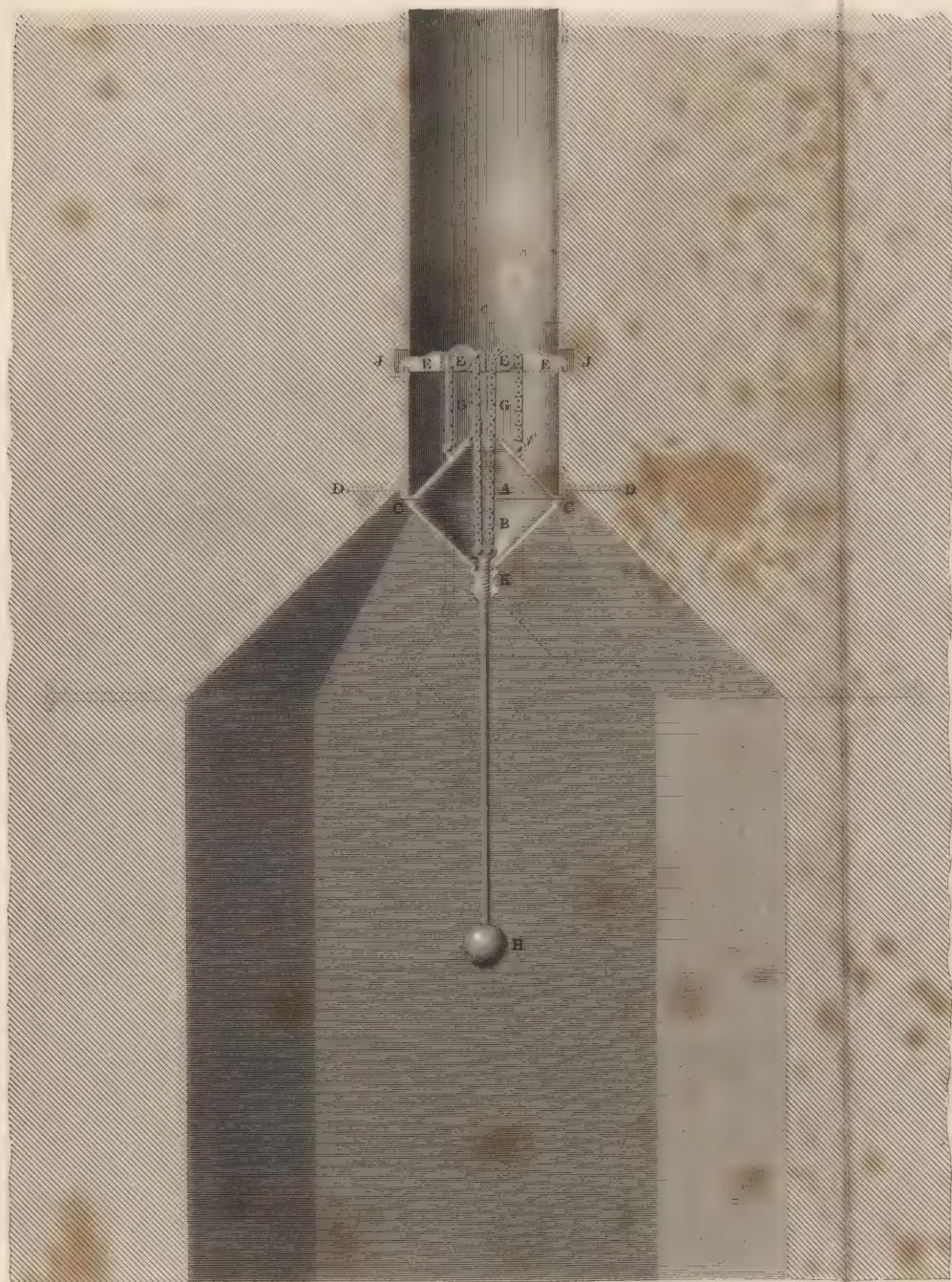
Fig. 6.



Fig. 7.



Fig. 8.



Drawn by T. Pitt.

Fig. 9.

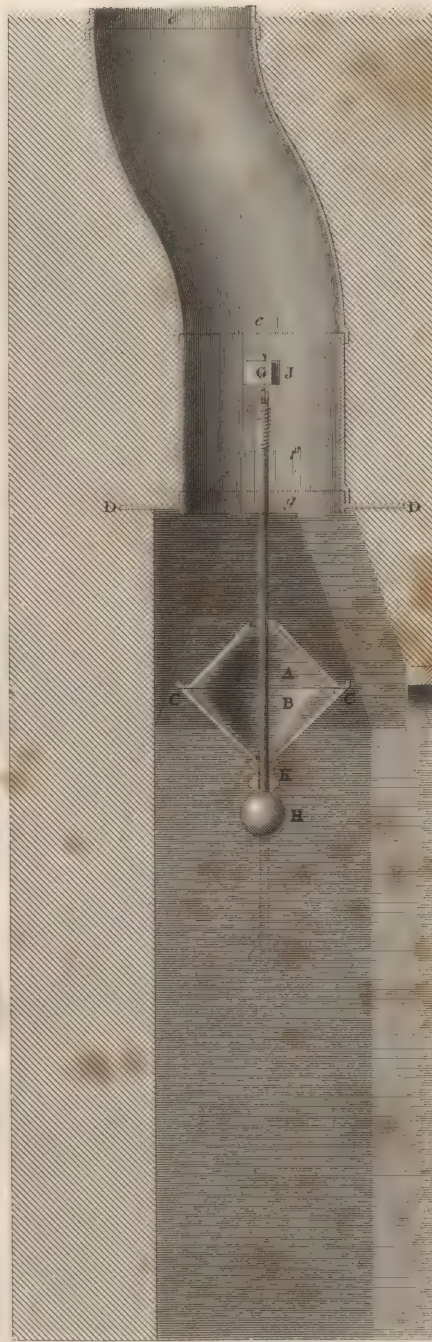


Fig. 11.



Fig. 13.



Fig. 12.

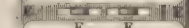


Fig. 15.



Fig. 17.



Fig. 12.



Fig. 18.



Fig. 10.

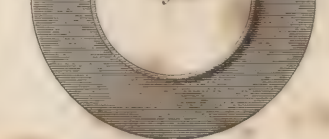


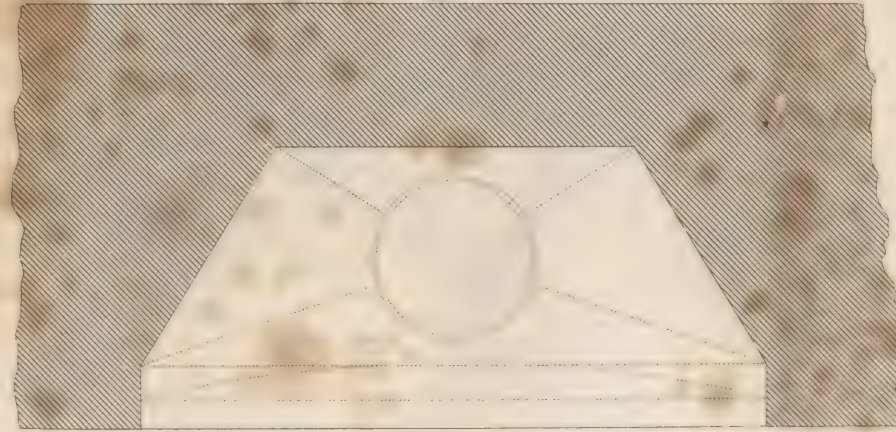
Fig. 16.



Fig. 19.

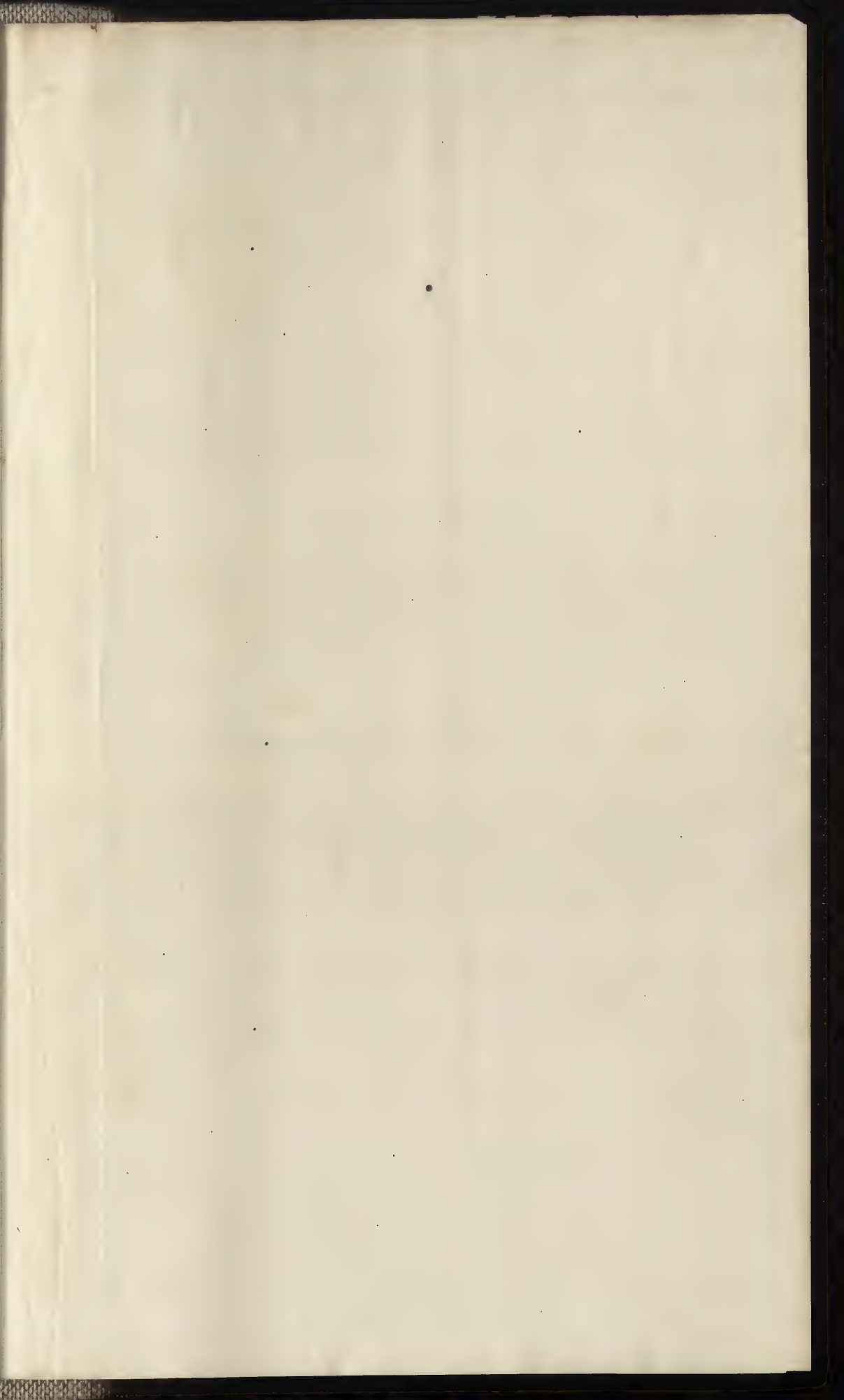


Fig. 20.



Engraved by W. Kilmour.

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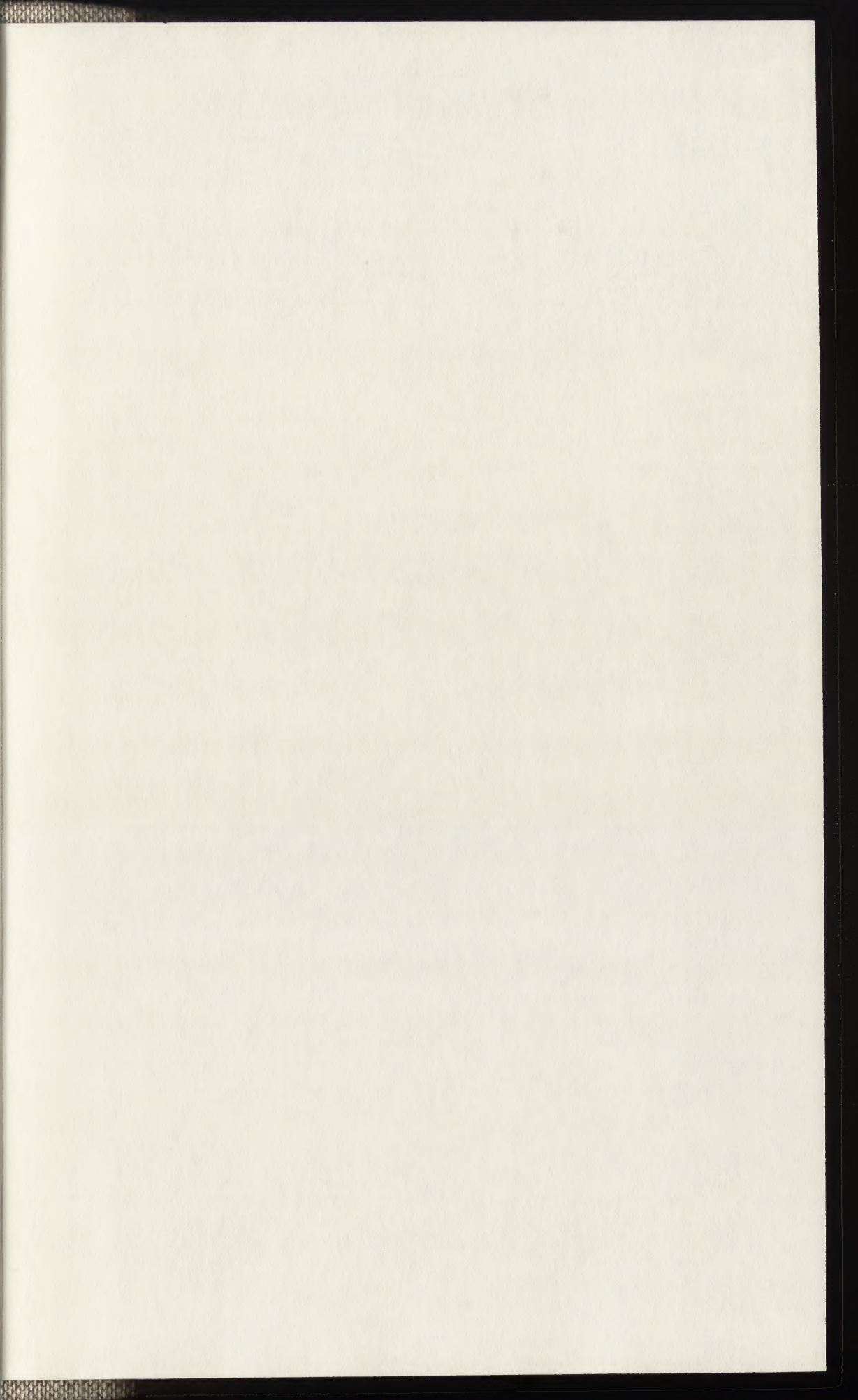


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